Nicholas Brodbeck

Languages: C/C++, Python, JavaScript, Lua, SQL
Technologies: Git, Node.js, REST, MongoDB, FreeRTOS, CAN bus

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Education

University of Waterloo   Waterloo, Ontario
Bachelor of Computer Science, Co-op   September 2022 - April 2026

- Relevant Coursework:
  - ‣ Realtime Programming   ‣ Operating Systems   ‣ Compilers
  - ‣ Algorithms & Datastructures   ‣ Computer Organization & Design

Experience

Software Engineer - Embedded   C, Python
Motive Technologies   May 2025 - December 2025

- Developed and tested embedded software for reliable **CAN bus** message processing in vehicle telematics systems
- Optimized a high-throughput CAN Rx path resulting in a **13% drop in CPU utilization** and a **packet drop rate below 1%**
- Conducted benchmark testing and compiled results into an interactive dashboard for **data-driven** optimization.

Software Engineer - Satellite Systems   C++, Python
MDA Space   September 2024 - December 2024

- Worked on the **embedded software** for the on-board processor (OBP) of a software-defined digital satellite product
- Conducted verification and validation of the OBP using **pytest** and **C++**, ensuring compliance with product requirements
- Led API documentation automation with **Doxygen, Sphinx** and **Pandoc**, providing consistency and **minimizing effort** team-wide

Firmware Subteam Member   C, FreeRTOS, Git
UW Orbital Design Team   September 2023 - Present

- Designed, developed and tested firmware aboard a **CubeSat** for the Canadian Satellite Design Challenge
- Employed FreeRTOS on a TI-RM46 MCU while interfacing with peripherals via **I²C** communication protocol

Embedded Firmware Engineer   C, FreeRTOS, ESP32
Wrmth   January 2024 - April 2024

- Developed and tested firmware for **IoT** systems embedded in heated outdoor smart furniture
- Implemented **Bluetooth Low Energy (BLE)** GATT services & characteristics to interact with a mobile app over Bluetooth

Machine Learning Engineer   Python, XGBoost, Tensorflow, MATLAB, Git
Health and Rehab Research, Inc.   June 2023 - September 2023

- Conducted research and development on deep learning models powering a Brain-Computer Interface (BCI)
- Employed a **graph neural network (GNN)** to classify imagined movements (Motor Imagery) from live EEG readings
- Discovered and eliminated data leaking in the training process for an overall **increase of 11% in performance accuracy**

Game Developer   Lua, Git
Self-Employed   January 2021 - September 2022

- Spearheaded development on 2 round-based, and 5 drop-in-drop-out multiplayer games on the **Roblox** platform
- Generated over **235 million plays**, roughly **1,500 peak concurrent users** and over **$200,000 USD in revenue**
- Delivered monthly Live Ops updates to an engaged community of over **4.0 million monthly active users**

Projects

Chess Engine   C++

- Developed a chess engine that supports all standard chess rules including castling, en passant and pawn promotions
- Utilized a robust **object-oriented** methodology supported by **UML** diagrams to enhance project visualization
- Employed Observer, Command, and Decorator **design patterns** to enhance modularity, scalability, and maintainability
- Ensured memory and exception safety by adhering to **Resource Acquisition Is Initialization (RAII)** principles